# UNITED STATES PATENT AND TRADEMARK OFFICE

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

_____

*Ex parte* GENADY GRABARNIK, JOSEPH L. HELLERSTEIN,
SHENG MA, CHANG-SHING PERNG,
and DAVID HUTCHINSON THOENEN

_____

Appeal 2008-1664
Application 09/976,543
Technology Center 2100

_____

Decided[1]: March 10, 2009

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Before JAY P. LUCAS, ST. JOHN COURTENAY III, and
STEPHEN C. SIU, *Administrative Patent Judges*.

SIU, Administrative Patent Judge.

DECISION ON APPEAL

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[1] The two month time period for filing an appeal or commencing a civil
action, as recited in 37 CFR § 1.304, begins to run from the decided date
shown on this page of the decision. The time period does not run from the
Mail Date (paper delivery) or Notification Date (electronic delivery).

STATEMENT OF THE CASE

This is a decision on appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1-29. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

*The Invention*

The disclosed invention relates generally to event relationship networks (Spec. 1). Specifically, a user generates an event relationship network in which nodes represent events that are linked to correlated nodes (Spec. 3). The event relationship network is validated using a statistical correlation analysis such as a pairwise correlation analysis (Spec. 4).

Independent claim 1 is illustrative:

> 1.    A computer-based method for use in accordance with an event management system, the method comprising the steps of:
>
> automatically generating one or more event relationship networks from event data, wherein an event relationship network comprises a graphical representation wherein nodes represent events and links connect correlated nodes; and
>
> utilizing the one or more generated event relationship networks to construct one or more correlation rules for use by a correlation engine in the event management system.

*The References*

The Examiner relies upon the following references as evidence in support of the rejections:

| | | |
|---|---|---|
| Babson | US 5,345,380 | Sep. 06, 1994 |
| Yoshida | US 6,006,213 | Dec. 21, 1999 |
| Tenev | US 6,108,698 | Aug. 22, 2000 |
| Yemini | US 6,249,755 B1 | Jun. 19, 2001 |

Deepak Mishra, *Snoop: An Event Specification Language for Active Database Systems,* University of Florida (Thesis), 1991, pp. 1-75. ("Mishra").

Claudio Bettini, et al., *Testing Complex Temporal Relationships Involving Multiple Granularities and Its Application to Data Mining,* ACM 1996, pp. 68-78 ("Bettini").

*The Rejections*

1. The Examiner rejects claims 1, 3, 14, 16, and 27 under 35 U.S.C. § 103(a) as being unpatentable over Mishra and Yoshida.

2. The Examiner rejects claims 2 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Mishra, Yoshida, and Babson.

3. The Examiner rejects claims 4-7, 11, 13, 17-20, 24, and 26 under 35 U.S.C. § 103(a) as being unpatentable over Mishra, Yoshida, and Yemini.

4. The Examiner rejects claims 8-10, 12, 21-23, and 25 under 35 U.S.C. § 103(a) as being unpatentable over Mishra, Yoshida, Yemini, and Bettini.

5. The Examiner rejects claims 28 and 29 under 35 U.S.C. § 103(a) as being unpatentable over Mishra and Tenev.

ISSUE #1

Appellants assert that "[t]he Mishra/Yoshida combination does not disclose automatically generating one or more event relationship networks from event data, wherein an event relationship network comprises a graphical representation wherein nodes represent events and links connect correlated nodes, as in the claimed invention" (App. Br. 4-5) because "the event graph of Mishra is not an event relationship network that can be used to construct one or more correlations rules" (App. Br. 5) and because "[t]he Yoshida reference fails to supplement the . . . deficiencies of Mishra as applied to claim 1" (*id.*).

Did Appellants demonstrate that the Examiner erred in finding that Mishra and/or Yoshida discloses automatically generating one or more event relationship networks from event data, wherein an event relationship network comprises a graphical representation wherein nodes represent events and links connect correlated nodes, as in the claimed invention?

FINDINGS OF FACT

The following Findings of Facts (FF) are shown by a preponderance of the evidence.

1. Mishra discloses generating an "[e]vent graph . . . [comprising] of non-terminal nodes (N-nodes), terminal nodes (T-nodes) and links" (page 58) by inputting "rule definitions" into an "Event Compiler" that "converts the event expressions . . . into an appropriate tree structure" (page 57), wherein "[e]ach node represent[s] either a primitive event or a composite event" (page 58).

2. Mishra also discloses that the "[l]inks are means through which stimulation is sent to the nodes" (page 58).

3. Mishra discloses that the event graphs are utilized to "detect complex events" and that "detection of primitive events is crucial to the performance of ECA rule mechanism" (page 69).

4. Mishra discloses that during simultaneous occurrence of events, the event graph is utilized "to fire the rule as soon as the parameters of a primitive event becomes available" (pages 69-70).

5. Yoshida discloses utilizing input data to obtain "extracted patterns" that "are converted into rules for classification or rules for high-speed operation" (col. 2, ll. 45-48).

6. Mishra discloses an "Event Compiler" (page 57) that contains an "[a]lgorithm for building the [event] graph" (page 57) that

"comprises of non-terminal nodes (N-nodes), terminal nodes (T-nodes) and links" (page 58).

7.  Babson discloses a "plurality of types of nodes, the nodes indicating the determinations and actions allowable for the procedure" (col. 2, l. 68 – col. 3, l. 2) and "presenting the customer with" the plurality of nodes (col. 2, l. 68).

8.  Babson discloses that the customer indicates "desired nodes" and "desired relationships between the desired nodes" and "values for parameters to be used with the desired nodes" (col. 3, ll. 3-7).

9.  Yemini discloses a "probabilistic correlation model is a matrix" (col. 17, l. 41) and "correlation measures [that] may be combined to refine the correlation model" (col. 17, ll. 59-60).

10. Yemini discloses "probabilistic correlation" (col. 17, l. 41) in which a "correlation matrix may include pairs" (col. 17, ll. 60-61).

11. Yemini also discloses performing "multiple linear regression analysis" to "identify correlations among events which are detected in the system (i.e., identify events that occur in pairs . . ." (col. 25, ll. 2-6).

12. Yemini discloses "allowing a user to specify a particular correlation threshold . . . to weed out weakly correlated events" (col. 25, ll. 11-13).

13. Yemini discloses an "event decoder 10 . . . [that] classifies a vector of observed symptoms into the most appropriate code" (col. 19, ll. 27-29), removing "weakly correlated data" after "correlations among events are stored" (col. 25, ll. 9-11), and that "correlation measures may be combined to refine the correlation model" (col. 17, ll. 59-60).

14. Bettini discloses "event-discovery problems" (page 74, col. 1) involving eliminating "inconsistent event structures," reducing "the event sequence," "the occurrences of the reference event type to be considered," and "the candidate complex types," and scanning "the event sequence . . . to find out if it frequently occurs" (page 74, col. 1).

15. Bettini discloses "an event sequence" that is represented by the "timed automation with granularities (TAG)" of Bettini (page 72, col. 1).

16. Bettini discloses "consistency checking" of events in which a determination is made of a "relationship between $X_1$ and $X_0$" and determining "the distance between $X_0$ and $X_2$" (page 71, col. 1).

## PRINCIPLES OF LAW

### 35 U.S.C. § 103(a)

Section 103 forbids issuance of a patent when "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been

7

obvious at the time the invention was made to a person having
ordinary skill in the art to which said subject matter pertains."

*KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007).
"What matters is the objective reach of the claim. If the claim

extends to what is obvious, it is invalid under *§ 103*." *KSR Int'l Co. v.*

*Teleflex, Inc.*, 127 S. Ct. at 1742 (2007). In *KSR*, the Supreme Court

emphasized "the need for caution in granting a patent based on the

combination of elements found in the prior art," *Id.* at 1739, and discussed

circumstances in which a patent might be determined to be obvious. *KSR,*

127 S. Ct. at 1739 (citing *Graham v. John Deere Co.*, 383 U.S. 1, 12

(1966)). The Court reaffirmed principles based on its precedent that "[t]he

combination of familiar elements according to known methods is likely to be

obvious when it does no more than yield predictable results." *Id.* The

operative question in this "functional approach" is thus "whether the

improvement is more than the predictable use of prior art elements according

to their established functions." *Id.* at 1740.


ANALYSIS (ISSUE #1)

As set forth above, Mishra discloses utilizing rule definitions to

generate an event relationship network from event data (i.e., an event graph)

that includes a graphical representation (i.e., an appropriate tree structure)

wherein nodes (i.e., N-nodes or T-nodes) represent events and links connect

correlated nodes (i.e., links are means through which stimulation is sent to nodes) (FF 1-2). We find no distinction between the event graph of Mishra and the claimed event relationship network.

Appellants argue that Mishra fails to disclose or suggest utilizing "the one or more generated event relationship networks to construct one or more correlation rules" (App. Br. 5). However, as set forth above, Mishra discloses performance of an ECA rule mechanism (FF 3) based on the event graph and executing the rule (FF 4). Hence, Mishra discloses that rules are constructed from the event graph (and may be "fired" as soon as the parameters of a primitive event becomes available). In view of the explicit disclosure by Mishra of both generating an event graph (i.e., a graphical representation of nodes that represent events) and formulating rules (e.g., ECA rule) that are "fired," we disagree with Appellants' contention that Mishra fails to disclose these features.

In addition, the Examiner relies on Yoshida to disclose or suggest utilizing input data to obtain "extracted patterns" that "are converted into rules for classification or rules for high-speed operation" (col. 2, ll. 45-48). Because Yoshida discloses the general principle of generating correlation rules from input data, we disagree with Appellants' argument that Yoshida "fails to supplement" Mishra (App. Br. 5).

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 1-29 with respect to issue #1.

ISSUE #2

Appellants assert that "the Examiner has failed to identify a cogent motivation for combining Mishra and Yoshida in the manner proposed" (App. Br. 6).

Did Appellants demonstrate that the Examiner erred in finding that it would have been obvious to one of ordinary skill in the art to have combined the Mishra and Yoshida references?

ANALYSIS (ISSUE #2)

As set forth above, Mishra discloses inputting data (i.e., rule definitions) into a computer system to generate output data (i.e., an event relationship network or event graph) and utilizing the output data in the performance of an "ECA rule mechanism" and firing such rules "as soon as the parameters of a primitive event becomes available." Similarly, Yoshida discloses inputting data (i.e., input graph containing patterns (col. 2, l. 40)) into a computer system to generate output data (i.e., extracted patterns – col.

2, l. 46) and utilizing the output data (i.e., converting the extracted patterns – col. 2, l. 46) to generate rules (i.e., rules for classification or for high-speed operation – col. 2, ll. 46-47).

There are a finite number of ways in which one of ordinary skill in the art would have generated rules from input data. In one known method as disclosed by Mishra, one of ordinary skill in the art would have input event data into an Event Compiler to generate an event graph (i.e., an event relationship network) and utilize the generated event graph to perform an ECA rule mechanism such that the rules may be fired "as soon as possible." In another known method as disclosed by Yoshida, one of ordinary skill in the art would have input data containing patterns into a computer system to generate output data and to generate rules (e.g., rules for classification) from the output pattern data. Because the combination of the known methods of Mishra and Yoshida would have entailed no more than the mere rearrangement of known elements performing their known functions to achieve a predictable result (i.e., obtaining output results such as rules from input data), we agree with the Examiner that such a combination would have been obvious to one of ordinary skill in the art. "The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR*, 127 S. Ct. at 1739. "[W]hen a patent 'simply arranges old elements with each performing the

same function it had been known to perform' and yields no more than one would expect from such an arrangement, the combination is obvious." *Id.* at 1740 (citing *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282 (1976)).

Appellants have failed to demonstrate that such a combination of the known methods of Mishra and Yoshida of inputting data into a computer system to generate desired rules would have resulted in anything more than a mere rearrangement of known methods to achieve the expected result of obtaining the desired rules and applying (i.e., "firing") such rules or that combining the known method of Mishra with that of Yoshida would have been "uniquely challenging or difficult for one of ordinary skill in the art" (*see Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (citing *KSR*, 127 S. Ct. 1727, 1741)) or would have required anything more than mere common sense on the part of one of ordinary skill in the art. "[T]he common sense of those skilled in the art demonstrates why some combinations would have been obvious where others would not." *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1161 (Fed. Cir. 2007) (citing *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1739 (2007)). As such, we cannot agree with Appellants' contention that the combination of Mishra and Yoshida would not have been obvious to one of ordinary skill in the art.

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 1-27 with respect to issue #2.


ISSUE #3

The Examiner finds that Mishra discloses reading a "rule_definition" and "when the rule_definition is read on page 57, line 9, the node associated with the rule_definition is read, as the node is the event that is associated with the rule" (Ans. 15). The Examiner further finds that the "event graph is a node with links connecting correlated events" and that "the rule_definition itself is an event graph consisting of a single nodes with no links" (*id.*).

Appellants assert that "it is not clear how 'Read rule_definition' in Mishra teaches or suggests obtaining one or more previously generated event relationship networks" (App. Br. 7) because "a rule [of Mishra] is the input for the graph building algorithm, and not an event relationship network" (*id.*).

Did Appellants demonstrate that the Examiner erred in finding that Mishra and/or Yoshida discloses or suggests obtaining one or more previously generated event relationship networks?

ANALYSIS (ISSUE #3)

As set forth above, Mishra discloses generating an event graph (FF 6). After the event graph is created by the event compiler, the event graph is used "for detecting composite events" (page 58). Hence, Mishra discloses that an event graph (i.e., an event relationship network) is generated, then utilized to detect events. If Mishra creates a graph, then uses the graph, it stands to reason that the graph that is used by Mishra has been previously generated because Mishra would be unable to utilize a graph that has not yet been created. Therefore, we agree with the Examiner that Mishra must create the graph first, then "obtain" the previously generated graph for later use.

Appellants argue that "a rule [of Mishra] is the input for the graph building algorithm, and not an event relationship network" (App. Br. 7). However, the graph building algorithm of Mishra, as set forth above, is used to create the event graph that contains nodes and links. Therefore, the event graph of Mishra contains each recited feature of the claimed "event relationship network." Appellants have failed to demonstrate, nor do we find, a specific functional or structural difference between Mishra's event graph and the recited "event relationship network." In the absence of Appellants' showing of any such functional or structural differences, we cannot agree that the event graph of Mishra is "not an event relationship network" as argued by Appellants.

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 3-7 and 16-20 with respect to issue #3.


ISSUE #4

The Examiner finds that each of the validating, completing, and outputting steps of claims 3-7 and 16-20 are "taught in Mishra" (Ans. 15) because the method of Mishra "results in a previously generated rule to be obtained . . ., the defining of the tree and modifying 'action' part of the original rule constitutes validating and completing . . . and the method results in the creation of the Rule_b, which is outputted for the creation of the event graph" (Ans. 15).

Appellants assert that "it is also not clear how the fact that Mishra describes 'Define trees (i.e., nodes) corresponding to rule_event1 and rule_event2 in the forest' teaches or suggests validating the one or more previously generated event relationship networks by removing any nodes or links included therein that are incorrect for a particular application context" (App. Br. 7) and that "it is not clear how 'build_tree' of Mishra discloses the step of completing the one or more previously generated event relationship networks by adding any nodes or links thereto that are missing for the particular application context" (id.). Appellants also assert that "'Create Rule_b' and 'merge it in the event_forest' of Mishra do not teach or suggest

outputting the one or more validated and completed event relationship networks as the one or more event relationship networks used to construct the one or more correlation rules" (*id.*).

Did Appellants demonstrate that the Examiner erred in finding that Mishra and/or Yoshida discloses or suggests the validating, completing and outputting steps of claims 3-7 and 16-20?

ANALYSIS (ISSUE #4)

As set forth above, the Examiner finds that Mishra discloses each of the validating, completing, and outputting steps as recited in claims 3-7 and 16-20. While Appellants argue that "it is not clear how" each of the Examiner's findings in Mishra "discloses [each of] the step[s]," Appellants have nevertheless failed to demonstrate how each of the Examiner's findings supposedly differ from the corresponding claim recitation. For example, Appellants argue that "it is not clear how 'build tree' of Mishra discloses the step of completing" an event relationship network "by adding any nodes or links thereto." However, in the process of "building the tree" that includes nodes in Mishra, nodes are added since "building" the tree, using a broad but reasonable definition, would include increasing, enlarging, or ordering materials into a whole. We do not find, nor do Appellants indicate, a specific difference between increasing and enlarging nodes into a whole

(i.e., "building") and adding nodes and links to the network. Appellants similarly fail to demonstrate specific differences between the Mishra disclosure and each of the other steps recited in claim 3 or claim 16.

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 3-7 and 16-20 with respect to issue #4.

ISSUE #5

The Examiner finds that "Babson when combined with the teachings of Mishra in view of Yoshida, does teach having a human view an event graph during the generation of an update of the graph . . . (see, for example, Babson at column 2, line 64 to column 3, line 9)" (Ans. 17).

Appellants assert that "Babson does not disclose subjecting the one or more generated event relationship networks to human review prior to utilizing the one or more generated event relationship networks to construct the one or more correlation rules" (App. Br. 7) because "the relied-upon portions of Babson refers to" a disclosure "which is not relevant to the rejection of the claimed features in claims 2 and 15" (App. Br. 7-8).

Did Appellants demonstrate that the Examiner erred in finding that Mishra and/or Yoshida discloses or suggests subjecting generated event relationship networks to human review?

ANALYSIS (ISSUE #5)


Babson discloses presenting a plurality of "nodes" to a customer (FF 7). The representation of nodes of Babson represent events (i.e., an event relationship network) that are presented to a customer (i.e., a "human"). Also, Babson discloses that the customer indicates "desired nodes" and "desired relationships between the desired nodes and "values for parameters to be used with the desired nodes" (col. 3, ll. 3-7). Therefore, the "human" (i.e., the customer in Babson) is subject to the network of nodes and reviews the network (in order to indicate, for example, the desired nodes). Appellants fail to point to a discernible difference between the disclosure of Babson and the claimed limitation of subjecting a network to human review. We therefore, disagree with Appellants that Babson is "not relevant to the rejection of" claims 2 and 15.

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 2 and 15 with respect to issue #5.


ISSUE #6

Appellants assert that "the motivation set forth by the Examiner to combine Babson with Mishra and Yoshida is insufficient" (App. Br. 8).

Did Appellants demonstrate that the Examiner erred in finding that it would have been obvious to one of ordinary skill in the art to combine the disclosure of Babson with those of Mishra and Yoshida?

ANALYSIS (ISSUE #6)

Appellants fail to indicate a specific reason as to why the motivation to combine Babson, Mishra and Yoshida is supposedly "insufficient." Nor do we find a specific deficiency in the Examiner's stated rationale as to why it would have been obvious to one of ordinary skill in the art to combine the cited references. In view of Appellants' lack of support of "insufficiency" of the Examiner's finding, we cannot agree with Appellants that the Examiner's finding is "insufficient."

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 2 and 15 with respect to issue #6.

ISSUE #7

Appellants assert that Yemini discloses "a well-formed correlation matrix" but does not disclose utilizing "a statistical correlation analysis" (App. Br. 8).

Did Appellants demonstrate that the Examiner erred in finding that Mishra, Yoshida, and/or Yemini discloses or suggests utilizing a statistical correlation analysis?

## ANALYSIS (ISSUE #7)

Yemini discloses a "probabilistic correlation model is a matrix" (col. 17, l. 41) and that "correlation measures may be combined to refine the correlation model" (col. 17, ll. 59-60). We find no specific structural or functional differences between Yemini's disclosure that the matrix is a correlation model that is refined using correlation measures and the statistical correlation analysis recited in the claims. Appellants, while asserting that the correlation model and correlation measures are not the same or suggestive of "a statistical correlation analysis," nevertheless fail to indicate specific features that distinguish the probabilistic correlation model and correlation measures of Yemini from the claimed "statistical correlation analysis."

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 4, 5, 17, and 18 with respect to issue #7.

ISSUE #8

Appellants assert that "[i]t is not clear how the correlation matrix including pairs of the form {Pr,t) where Pr is a probability indication, as disclosed in Yemini, teaches or suggest the claimed features of claims 5 and 18" (App. Br. 8).

Did Appellants demonstrate that the Examiner erred in finding that Mishra, Yoshida, and/or Yemini discloses or suggests utilizing a pairwise correlation analysis, wherein correlation between a pair of events is measured in accordance with statistical measurements?

ANALYSIS (ISSUE #8)

Yemini discloses "probabilistic correlation" (col. 17, l. 41) in which a "correlation matrix may include pairs" (col. 17, ll. 60-61). Yemini also discloses performing "multiple linear regression analysis" to "identify correlations among events which are detected in the system (i.e., identify events that occur in pairs . . ." (col. 25, ll. 2-6). Appellants, while asserting that "it is not clear how" Yemini's disclosure teaches or suggests a "pairwise correlation analysis" as recited in claims 5 and 18, nevertheless fail to provide a rationale as to how Yemini's probabilistic correlation using pairs of parameters or identifying events that occur in pairs using multiple linear regression analysis is different or not suggestive of a "pairwise correlation analysis" as recited. Indeed, the concepts appear to be equivalent.

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 5 and 18 with respect to issue #8.

ISSUE #9

Appellants assert that "it is not clear how applying a filter to remove weakly correlated data after correlations among events are stored in data file teaches or suggests for a particular event relationship network, determining that links in the event relationship network have a confidence level not less than a given threshold" (App. Br. 8).

Did Appellants demonstrate that the Examiner erred in finding that Mishra, Yoshida, and/or Yemini discloses or suggests determining that links in the event relationship network have a confidence level not less than a given threshold?

ANALYSIS (ISSUE #9)

Yemini discloses "allowing a user to specify a particular correlation threshold . . . to weed out weakly correlated events" (col. 25, ll. 11-12). Thus, weakly correlated events (i.e., those having a confidence level less than a given threshold, the threshold being specified by a user) are determined. Appellants assert that "it is not clear how" determining correlated events that fall below a specified threshold is equivalent or

suggestive of determining links having a level less than a given threshold but fail to demonstrate any specific differences between the seemingly identical concepts. Therefore, we cannot agree with Appellants.

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 6 and 19 with respect to issue #9.

ISSUE #10

The Examiner finds that Yemini discloses "splitting the event relationship network into correlation paths (Yemini, col. 19, l.23-33, in which the classifies corresponds to split)" (Ans. 8), "for every correlation path, removing a node . . . (Yemini, col. 25, l.9-13)" (*id.*) and "merging correlation paths into one or more event relationship networks . . . (Yemini, col. 17, l.59-65)" (*id.*).

Appellants assert that "[i]t is not clear how the features specifically defined in claims 7 and 20 could be taught or suggested by the cited portions of Yemini" (App. Br. 8-9).

Did Appellants demonstrate that the Examiner erred in finding that Mishra, Yoshida, and/or Yemini discloses or suggests the splitting, removing and merging steps recited in claims 7 and 20?

ANALYSIS (ISSUE #10)

Yemini discloses an "event decoder 10 . . . [that] classifies a vector of observed symptoms into the most appropriate code" (col. 19, ll. 27-29), removing "weakly correlated data" after "correlations among events are stored" (col. 25, ll. 9-11), and that "correlation measures may be combined to refine the correlation model" (col. 17, ll. 59-60). Even assuming that the term "classifies" is equivalent to the recited term "splitting," as the Examiner finds, the Examiner has not demonstrated that Yemini also discloses that a node is removed from the "most appropriate code" (which the Examiner equates with the claimed "correlation paths") or that the "most appropriate codes" are merged into one or more event relationship networks. Indeed, the Examiner has not shown that the "most appropriate code" even contains nodes to be removed.

Rather, Yemini discloses that "weakly correlated data" is removed rather than nodes from the "most appropriate code" and that "correlation measures" are combined into a refined "correlation model" rather than "most appropriate codes" being merged into an event relationship network. In view of these discrepancies, we cannot agree with the Examiner that Yemini discloses or suggests the splitting, removing and merging steps recited in claims 7 and 20.

For at least the aforementioned reasons, we conclude that Appellants have demonstrated that the Examiner erred in rejecting claims 7 and 20 with respect to issue #10.

## ISSUE #11

Appellants assert that "the motivation set forth by the Examiner to combine Yemini with Mishra and Yoshida is insufficient" (App. Br. 9).

Did Appellants demonstrate that the Examiner erred in finding that it would have been obvious to one of ordinary skill in the art to combine the disclosures of Mishra and Yoshida with that of Yemini?

## ANALYSIS (ISSUE #11)

Appellants fail to indicate a specific reason as to why the Examiner's rationale for the combination of Yemini with Mishra and Yoshida is supposedly "insufficient." Nor do we find a specific deficiency in the Examiner's stated rationale as to why it would have been obvious to one of ordinary skill in the art to combine the cited references. In view of Appellants' lack of support of "insufficiency" of the Examiner's finding, we cannot agree with Appellants that the Examiner's finding is "insufficient."

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 4-7 and 17-20 with respect to issue #11.

ISSUE #12

Appellants assert that "it is not clear how Bettini at page 73, Figure 2, discloses 'utilizing the mined patterns to construct the one or more event relationship networks'" (App. Br. 9) because the "TAG [of Bettini] . . . not one or more event relationship networks. (Bettini, page 68, column 2, line 40 through page 69, column 1, line 2)" (*id.*).

Did Appellants demonstrate that the Examiner erred in finding that Mishra, Yoshida, Yemini and/or Bettini discloses or suggests the utilizing the mined patterns to construct the one or more event relationship networks?

ANALYSIS (ISSUE #12)

As set forth above, Mishra discloses generating an event relationship network in which events are represented as nodes in an event graph. Similarly, Bettini discloses "event-discovery problems" (page 74, col. 1) involving eliminating "inconsistent event structures," reducing "the event sequence," "the occurrences of the reference event type to be considered," and "the candidate complex types," and scanning "the event sequence . . . to find out if it frequently occurs" (page 74, col. 1). Hence, Bettini discloses scanning event sequences and determining patterns of events which includes, for example, a frequency of occurrence.

Appellants argue that the "TAG" of Bettini is "not one or more event relationship networks" (App. Br. 9). However, Bettini discloses "an event sequence" that is represented by the "timed automation with granularities

26

(TAG)" of Bettini (page 72, col. 1). Thus, the TAG of Bettini (Fig. 2) is a graphical representation of an event sequence in which events are represented by "nodes" that are interconnected by "links" (i.e., arrows connecting the events in sequence). Because an "event relationship network" is recited as containing a graphical representation in which nodes represent events interconnected by links and because the TAG of Bettini (Fig. 2) also contains a graphical representation in which nodes represent events interconnected by links, we do not find a distinction between the recited "event relationship network" and Bettini's TAG. Nor do Appellants provide arguments supporting such a distinction.

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 8 and 21 with respect to issue #12.

ISSUE #13

Appellants assert that "it is not clear how the recited portions of Bettini teach or suggest the claimed features of utilizing a statistical correlation analysis to mine patterns" (App. Br. 9) because "[t]he relationship between $X_1$ and $X_0$ dictating that the event assigned to $X_0$ must happen during the month of a year does not disclose the claimed features of claims 9 and 22" (App. Br. 9).

27

Did Appellants demonstrate that the Examiner erred in finding that Mishra, Yoshida, Yemini and/or Bettini discloses or suggests utilizing a statistical correlation analysis to mine patterns?

## ANALYSIS (ISSUE #13)

Bettini discloses "consistency checking" of events in which a determination is made of a "relationship between $X_1$ and $X_0$" and determining "the distance between $X_0$ and $X_2$" (page 71, col. 1). Hence, Bettini discloses determining a "statistical correlation" (i.e., a statistical relationship) between parameters representing patterns of event sequences. While Appellants assert that Bettini's disclosure "does not disclose the claimed features of claims 9 and 22" (App. Br. 9), Appellants fail to indicate specific differences between Bettini's disclosure and the claimed features of claims 9 and 22.

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 9 and 22 with respect to issue #13.

## ISSUE #14

Appellants assert that "no where does Figure 1 [of Bettini] show the correlation between a pair of events measured in accordance with one or more statistical measurements" (App. Br. 9)

Did Appellants demonstrate that the Examiner erred in finding that Mishra, Yoshida, Yemini and/or Bettini discloses or suggests utilizing correlation analysis, wherein correlations between a pair of events is measured in accordance with statistical measurements?

## ANALYSIS (ISSUE #14)

As set forth above, Bettini discloses determining relationships between events (e.g., a relationship between $X_1$ and $X_0$). Appellants argue that Figure 1 supposedly does not show a correlation between events. However, because Bettini discloses determining relationships between events and because a "relationship," construed broadly but reasonably includes a "correlation," we find that Appellants have not demonstrated that Bettini fails to disclose or suggest a correlation between pairs of events.

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 10 and 23 with respect to issue #14.

## ISSUE #15

Appellants assert that "the motivation set forth by the Examiner to combine Bettini with Mishra, Yoshida and Yemini is insufficient" (App. Br. 10).

Did Appellants demonstrate that the Examiner erred in finding that it would have been obvious to one of ordinary skill in the art to combine the disclosures of Bettini with those of Mishra, Yoshida, and Yemini?


ANALYSIS (ISSUE #15)

Appellants fail to indicate a specific reason as to why the Examiner's rationale for the combination of Bettini with Mishra, Yoshida, and Yemini is supposedly "insufficient." Nor do we find a specific deficiency in the Examiner's stated rationale as to why it would have been obvious to one of ordinary skill in the art to combine the cited references. In view of Appellants' lack of support of "insufficiency" of the Examiner's finding, we cannot agree with Appellants that the Examiner's finding is "insufficient."

For at least the aforementioned reasons, we conclude that Appellants have not sustained the requisite burden on appeal in providing arguments or evidence persuasive of error in the Examiner's rejection of claims 8-10, 12, 21-23, and 25 with respect to issue #15.


ISSUE #16

Appellants assert that "[n]o where does . . . Tenev teach or suggest computing a first correlation metric and a second correlation metric, the second correlation metric being representative of a correlation between events that is stronger than a correlation between events represented by the first correlation metric, as in claim 28" (App. Br. 10).

30

The Examiner finds that Tenev discloses "utilizing different methods for producing different graphs from the same set of data (see, for example, figure 4)" (Ans. 24) and that "[w]hen Tenev is combined with Mishra, different graphs would be produced from the same set of events, where one graph is likely to have different strength in correlations than another" (*id.*).

Did Appellants demonstrate that the Examiner erred in finding that Tenev discloses or suggests the first and second correlation metrics as recited in claim 28?

## ANALYSIS (ISSUE #16)

The Examiner finds that Tenev discloses "producing different graphs" but does not demonstrate that Tenev also discloses computing a first and second correlation metric, the second correlation metric of events being stronger than the first correlation metric. Even assuming to be true the Examiner's finding that Tenev discloses "different graphs," we do not find a proper nexus between producing different graphs and computing a first and second correlation metric as recited in claim 28.

Accordingly, we conclude that Appellants have met their burden of showing that the Examiner erred in rejecting independent claim 28.

ISSUE #17

Appellants assert that "[n]o where does . . . Tenev teach or suggest specifying an event data window within which event data is considered, as in claim 29" (App. Br. 11).

The Examiner finds that "any information that is collected in the combination of Mishra and Tenev must have been collected during a certain time period, where the time period constitutes a window" (Ans. 24).

Did Appellants demonstrate that the Examiner erred in finding that Tenev discloses or suggests specifying an event data window within which event data is considered?

ANALYSIS (ISSUE #17)

Appellants argue that Tenev fails to teach or suggest specifying an event data window within which event data is considered. We agree. The Examiner finds that data in Mishra and Tenev "must have been collected during a certain time period" (Ans. 24), but does not demonstrate that either Mishra or Tenev discloses specifying such a "window" or considering events within the specified window.

Accordingly, we conclude that Appellants have met their burden of showing that the Examiner erred in rejecting independent claim 29.

## CONCLUSIONS OF LAW

Based on the findings of facts and analysis above, we conclude that Appellants have failed to demonstrate that the Examiner erred in:

1.      finding that Mishra and/or Yoshida discloses automatically generating one or more event relationship networks from event data, wherein an event relationship network comprises a graphical representation wherein nodes represent events and links connect correlated nodes, as in the claimed invention (issue #1),

2.      finding that it would have been obvious to one of ordinary skill in the art to have combined the Mishra and Yoshida references (issue #2),

3.      finding that Mishra and/or Yoshida discloses or suggests obtaining one or more previously generated event relationship networks (issue #3),

4.      finding that Mishra and/or Yoshida discloses or suggests the validating, completing and outputting steps of claims 3-7 and 16-20 (issue #4),

5.      finding that Mishra and/or Yoshida discloses or suggests subjecting generated event relationship networks to human review (issue #5),

6.      finding that it would have been obvious to one of ordinary skill in the art to combine the disclosure of Babson with those of Mishra and Yoshida (issue #6),

7.      finding that Mishra, Yoshida, and/or Yemini discloses or suggests utilizing a statistical correlation analysis (issue #7),

8.      finding that Mishra, Yoshida, and/or Yemini discloses or suggests utilizing a pairwise correlation analysis, wherein correlation between a pair of events is measured in accordance with statistical measurements (issue #8),

9.      finding that Mishra, Yoshida, and/or Yemini discloses or suggests determining that links in the event relationship network have a confidence level not less than a given threshold (issue #9),

10.     finding that it would have been obvious to one of ordinary skill in the art to combine the disclosures of Mishra and Yoshida with that of Yemini (issue #11),

11.     finding that Mishra, Yoshida, Yemini and/or Bettini discloses or suggests the utilizing the mined patterns to construct the one or more event relationship networks (issue #12),

12.     finding that Mishra, Yoshida, Yemini and/or Bettini discloses or suggests utilizing a statistical correlation analysis to mine patterns (issue #13),

13.    finding that Mishra, Yoshida, Yemini and/or Bettini discloses or suggests utilizing correlation analysis, wherein correlations between a pair of events is measured in accordance with statistical measurements (issue #14),

14.    finding that it would have been obvious to one of ordinary skill in the art to combine the disclosures of Bettini with those of Mishra, Yoshida, and Yemini (issue #15).

However, Appellant has demonstrated that the Examiner erred in finding that Mishra, Yoshida, and/or Yemini discloses or suggests the splitting, removing and merging steps recited in claims 7 and 20 (issue #10), that Tenev discloses or suggests the first and second correlation metrics as recited in claim 28 (issue #16), and that Tenev discloses or suggests specifying an event data window within which event data is considered (issue #17).

## DECISION

We affirm the Examiner's decision rejecting claims 1-6, 8-19, and 21-27 under 35 U.S.C. § 103.  We reverse the Examiner's decision rejecting claims 7, 20, 28, and 29 under 35 U.S.C. § 103.

Because we have affirmed at least one ground of rejection with respect to each claim on appeal, the Examiner's decision is affirmed.  See 37 C.F.R. § 41.50(a)(1).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

pgc

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